

# Area-wide Diabetes Care: the Lanarkshire Experience with Primary Health Care Teams 1994–1997

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In Lanarkshire (population 560 000) an area-wide diabetes database was introduced and process of care was measured. The number of patients with diabetes identified was 11 621 (prevalence = 2.08). In 1997 50 % of the diabetic population were reviewed at least once during the year. Compared to those attending hospital clinics, GP patients were significantly older, female and less likely to be on insulin. During 1994–1997 hospital clinics improved the process of care in nearly all areas, but GP patients were much less likely to have any of the process measures carried out. Initiatives are underway to support general practices, and to improve co-ordination between GP and hospital services. © 1998 John Wiley & Sons, Ltd.

*Diabet. Med.* 15 (suppl. 3): S54–S57 (1998)

## Introduction

The more an area knows about its diabetic patients, the more it can improve services. One of the key principles of the St Vincent Declaration was that providers of diabetic care are collectively responsible for the quality of care for all diabetic patients in their district;<sup>1</sup> PHCTs and hospital teams are no longer able to evade these responsibilities by 'Collusions of Anonymity'.<sup>2</sup>

Different models of sharing responsibility for care have been described.<sup>3</sup> Some have been described as 'shifted care' where patients are discharged from over-stretched hospital services into unprepared and under-resourced community services. Others conform to models of shared care where the three elements of a successful system are the 3 Rs of registration, recall, and regular review. A district-wide register<sup>4</sup> has often been seen as the first step in beginning improvements, a view endorsed by SIGN (the Scottish Intercollegiate Guidelines Network) which has produced evidence-based guidelines related to diabetic care.<sup>5</sup>

Standards for good information systems have been set by the national Information Management and Technology (IM&T) strategy<sup>6</sup> which recommends that all information systems should allow information to be derived operationally and shared across the NHS in a person-based, integrated, secure and confidential fashion. Clinical systems should also comply with the professional stan-

dards being set for computer-based patient records.<sup>7</sup> These standards include: the sharing of information between clinical staff; the provision of patient-based problem lists and measurements of health status and the facilitation both of clinical problem-solving and improvements in the quality of clinical care.

In Lanarkshire we are working towards developing a comprehensive approach to the care of people with diabetes. As part of this process we have introduced an area-wide diabetes database, and used it to measure the process of care. By comparing what is happening against what should be happening, we have identified necessary changes and thus begun to complete the audit cycle.

## Methods

Lanarkshire Health Board covers a population of 560 000 patients in central southern Scotland. Area-wide organization of diabetic care in Lanarkshire began in 1989 with the establishment of the Lanarkshire Diabetic Group.<sup>8</sup> This is a multidisciplinary forum containing diabetologists, nurses, general practitioners (GPs), biochemists, chiropractors, dieticians, public health physicians, and clinical audit staff which promotes high quality diabetes care through education, discussion, and clinical audit. On its formation, the group began a series of educational and organizational initiatives, informed by a developing flow of audit data.

The original software used in the first comparative audit of diabetic care in Lanarkshire was developed by a commercial company for use in general practice.<sup>9</sup> The software allowed practices to monitor and compare their

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overall performance, but the spreadsheet design meant that the progress of individual patients could not be followed, and this in turn precluded any assessment of overall patient outcome.

In 1992–93 the software was recreated in a database format using the DOS software application Paradox 4.5 at the Lanarkshire Audit Training Centre. We used a decision facilitation approach for the informatics component of the education.<sup>10</sup> The purpose of this methodology is to resolve the key issues for the system developers, clinicians and the health board who are funding the project. It achieves this by taking the questions posed by decision-makers and renders them amenable to empirical study by simplified data collection techniques.

Between 1994 and 1995 the software was substantially rewritten into a Windows format using Access 2.0, Visual Basic 3 and Crystal Reports 4. This version was installed onto computer equipment provided through the clinical audit budget in the hospital diabetic clinics and 19 local general practices.

By the end of 1997, the audit database covered all the Lanarkshire general practices and all four hospital diabetic clinics. The initial entry of data into the database was carried out in a variety of ways. In one hospital some demographic data were initially downloaded from a hospital database. In two hospitals one of the consultants loaded all the patients with the help of a clinical audit assistant. In the fourth hospital a team of ward-based nursing staff helped to abstract retrospective data from the clinical notes. In general practice additional funding for clerical support was provided to support data entry.

In the hospitals, on-going data entry is supported through the provision of part-time staff. In the 19 general practices, data are mainly entered by practice nurses operating diabetic clinics within practices, and from 1997 an audit facilitator began visiting the remaining practices and collect data from the manual notes, concentrating on diabetic patients who do not attend hospital clinics.

Information on individual patients is currently shared between hospitals and general practices using computer-generated letters and reports. Each site can audit its own

data locally. Data from all sites is also sent to the Audit Training Centre to allow a total picture of diabetes care in Lanarkshire to be built up. The current annual cost of maintaining the database is £47 000 (0.02% of the total annual Health Board budget) which translates to a cost per case of £4.00.

## Results

Table 1 shows the increasing number of patients registered over the last 4 years, demonstrating progressive recruitment of diabetic patients to the register. A further 3000+ patients names and addresses are held with no associated clinical data and during 1998 the case notes of these patients will be reviewed to determine their precise status.

All the hospital screening visits are recorded on the computer database. The number of hospital screening visits per annum across Lanarkshire has stabilized at approximately 6000. Over the last 4 years the percentage of patients reviewed to registered has fallen, reflecting the increasing numbers of patients registered on the systems. However although all hospital screening visits are now captured, only a proportion of the regular visits are recorded, and therefore the number of total hospital episodes is an underestimate of current activity.

In general practice it is less easy to distinguish between screening and regular visits, so a visit was recorded if any diabetic data were obtained during a year. The rapid increase in visits recorded in general practice reflects the progressive coverage of the database to cover all of Lanarkshire. Overall in both populations, 50 % of the diabetic population were reviewed at least once during 1997.

Table 2. Comparisons between hospital and GP only patients

	Hospital	GP	Significance
Total number of patients	8185	3101	
% on insulin	31.4	17.9	<0.0001
Mean age (years)	59.9	61.5	<0.0001
% male	54.7	52.5	0.037

Table 1. Area-wide results

	1994			1995			1996			1997		
	Hosp.	GP	Total	Hosp.	GP	Total	Hosp.	GP	Total	Hosp.	GP	Total
Patients registered	4100	249	4436	6745	849	7294	7776	2302	10078	8433	3188	11621
% Lanarkshire population	0.73 %	0.04 %	0.78 %	1.20 %	0.15 %	1.36 %	1.39 %	0.11 %	1.80 %	1.51 %	0.57 %	2.08 %
Patients with one or more visits recorded	3919	184	4103	2869	664	3533	4889	1724	6613	4178	1667	5845
% registered patients who visited with the year	96 %	74 %	94 %	43 %	78 %	47 %	63 %	75 %	66 %	50 %	52 %	50 %

Table 3. Process measures (percentage of patients with record of procedure in notes)

	1994		1995		1996		1997	
	Hosp. (%)	GP (%)	Hosp. (%)	GP (%)	Hosp. (%)	GP (%)	Hosp. (%)	GP (%)
HbA <sub>1c</sub>	84	62	90	58	92	60	96	63
BMI	53	78	39	63	90	53	98	47
BP	95	83	96	75	92	75	96	74
Urinary protein	13	4	20	9	23	4	26	0.3
Cholesterol	55	20	75	21	58	29	60	29
Dorsalis pedis	85	24	88	31	82	31	85	28
Fundoscopy	88	23	90	29	79	28	82	26
Visual acuity	94	30	96	32	83	33	85	28

Table 2 shows a comparison between the patient populations, demonstrating that there are statistically significant differences between those patients who attend hospital and those who only attend their GP. GP patients are significantly older, female and much less likely to be on insulin. However, the differences between the groups in age and sex are small and unlikely to have any clinical impact.

Table 3 shows the numbers of patients each year who have had a particular process measure carried out if there is any record of them attending. Over the last 4 years the hospitals have improved in all aspects except for eye examinations. Most of the fluctuations can be explained by the gradual recruitment of hospitals into the system as it has spread across Lanarkshire. The first hospital to implement the system fully has always maintained the most complete recording of process measures but provides a decreasing proportion of overall patient numbers. In general practice the picture over time has remained fairly constant with the exception of body mass index (BMI) measurements which have dropped sharply.

Table 3 also demonstrates marked differences in terms of the process of care between the patient attending hospitals and those who only attend general practice. Patients attending the GPs are much less likely to have any of the process measures carried out.

## Discussion

In 1997 the overall prevalence in Lanarkshire stood at 2.08 % of the total population suggesting that the register is close to containing all diabetic patients residing in Lanarkshire. Other districts have reported prevalence of diabetes as 1.5 % in Derbyshire,<sup>11</sup> 2.1 %–2.5 % in Taragora,<sup>12</sup> and 1.94 % in the DARTS<sup>13</sup> study which examined a very similar population. We are therefore confident that we have registered the majority of diagnosed diabetic people in Lanarkshire Health Board with the system. This implies that our primary aim of registering all patients in our district has been achieved.

In terms of the types of patients managed and the

recording of process of care measurements there appear to be large differences between general practice and hospital. Although our general practice results may appear disappointing when compared to the results obtained by the hospitals, they are congruent with results from other parts of the UK and overseas. In an English survey 42 % of 61 FHSAs reported that they had no policy for helping primary care introduce protocols for the management or referral of diabetic patients.<sup>14</sup> Elsewhere, overall compliance with guidelines tends to be low at around 16 %.<sup>15</sup> The Derbyshire Study<sup>11</sup> reports recording levels in primary care of 10.6 % for BMI, 29.2 % for HbA<sub>1c</sub>, 29.8 % for blood pressure (BP), 6.6 % for proteinuria, 1.3 % for fundoscopy, and 3.8 % for foot examination. Even in areas of the UK where structured diabetic primary care is the norm, <50 % of diabetic patients have dilated fundoscopy performed on an annual basis.<sup>16</sup>

The purpose of clinical audit is to compare current activities against predefined standards and make necessary changes. It is possible for primary care to improve standards of care; for example, a randomized control trial of a decision support system operated by a practice nurse led to widespread improvements in care with all patients having annual reviews plus 98 % patients having normal HbA<sub>1c</sub> levels.<sup>17</sup> Bearing this in mind there are now initiatives under way in Lanarkshire to support general practices in their care of diabetic patients, and to improve co-ordination between GP and hospital services.

The results of each practice audit containing both quantitative and qualitative figures have been presented back to each individual practice along with an invitation to attend an area-wide meeting where the overall results were presented, and the issues raised by the audit discussed. In particular the focus was on how the gaps in delivery of diabetes services in Lanarkshire could be targeted by both practices and the purchaser. The meeting also provided a forum to share examples of good practice and to discuss other related areas of concern, such as patient confidentiality.

Further work is also under way in each of the three hospital clinic areas to identify the practical ways of

improving the arrangements for shared care. So far, three main areas have been identified as requiring a more explicit approach. Firstly, a joint working group is looking to develop formal agreements for the provision of routine elements of diabetes care, specifying who will do what on each patient and at what frequency. Practices will be encouraged to consider the structure and systems of their diabetic care, including staff training, disease register, recall systems and agree protocols on referral. This process will also result in better patient information, as patients will be given information on the basic elements of care that they would expect to receive as well as being clear about where they will be receiving them.

Secondly, the exchange of information is being reviewed; for although GPs receive information on the patients' reviews carried at the hospital clinic, hospital consultants do not formally receive information on what happens when patients are seen in practice. There are also problems communicating between hospital and general practice staff and paramedical and nursing staff in the community. As part of this review, the group is planning to establish a foolproof yet easily implemented method of blood results being available for the hospital clinic.

Thirdly, a bid for additional funding has been made to the Health Board through LDSAG to address the current backlog in provision of diabetes care, particularly in relation to provision of eye screening.

In the longer term the focus will be on the outcome of care. It will be important to review progress in Lanarkshire in relation to the results obtained by other centres. Currently data from Lanarkshire are incorporated into patient registers held by the Royal College of the Physicians of Edinburgh, and the British Diabetic Association. Links are being made to data on hospital discharges and death held by the Information and Statistics Division of the Scottish Health Service. Lanarkshire software is in use in nine hospitals across Scotland, and we are also providing software support to two other health board areas developing area registers.

A joint bid for funding to develop comparative audit across three Scottish health board areas has been accepted by CRAG (the Clinical Resource and Audit Group at the Scottish Office). In terms of on-going development, one of our main goals is to coalesce the separate hospital and general practice databases into one unified networked database. This will be facilitated by the recent national moves to improve electronic linkages.<sup>28</sup>

Through these developments it is hoped to integrate the activities of individual patients, clinical staff, practices, hospital services and Lanarkshire Health Board fulfilling

one of the main objectives outlined in health improvement plan for diabetic patients in Lanarkshire. A clearer approach to sharing information rather than shifting responsibility for care for each patient should also ensure that services to patients improve.

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